

Scenario Art as a Decision-making Tool to Facilitate Sustainable Futures: The Case for Minerals and Mining in Australia

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Abstract: Scenario Art (visual representations of a future scenario, used to enhance decision-making processes) is offered as a new tool to facilitate a transition to sustainable futures. The paper acknowledges recent evaluations of current futures methods (methods for long-term decision making and strategy development that involve consideration of multiple future circumstances), which have found that the futures field is not having the transformative influence expected. It is argued that to have a transformative influence, world views need to be drawn out and examined. An analysis of the results of a workshop (Vision 2040) that tested the application of Scenario Art, alongside art and neurological theory, is used to explore the relationship between Scenario Art, neurological processes, and the implications of these neurological processes in the context of decision-making processes. Vision 2040 utilized a deliberative process and aimed to establish a shared vision and strategy for the future of the mining and minerals industry in Australia. The workshop involved a range of futures methods which provided an opportunity for mining stakeholders to explore how the mining and minerals industry in Australia can deliver long-term national benefit. This paper focuses on the results of applying Scenario Art at this workshop which support that Scenario Art increases a person's level of empathy, creativity, responsiveness to risk, imagination and willingness to consider alternative perspectives. In the context of developing a shared vision, it was found that this increased a person's ability to recognise strategies and actions that would benefit multiple stakeholders and to recognise shared and conflicting ideas, values and perspectives for a preferred future.

Keywords: Scenario Art, Art, Futures, Mining, Minerals, Sustainable Futures, Decision Making Processes

Vision of the Future

THE AIR HAS never been so clean; the waters, never so pristine; the trees, never so green. All energy demands are met by renewable energy sources. Consumption patterns have radically shifted; children are coming home from school to play soccer in the nearby park, to play 'tips' and 'hide and seek'. The world is taking cooperative and coordinated action to ensure long-term and equitable distribution of wealth. This achievement has been facilitated by the adoption of new international measures of wealth and development. Governments of all levels have adopted policies that recognise the physical health and happiness of its people and the ecosystems on which they depend as the ultimate goal. No longer do we blindly and tirelessly chase economic and physical growth but rather we strive for and achieve high levels of well-being for all people and our environments. People are happy and healthy, streets and parks full of colour. Never before has the health of humans and the natural environment been so great and living in harmony.

The words above describe a vision (a preferred future). Figure 1 is a visual representation of this vision and is an example of Scenario Art (a visual representation of a future scenario, used to enhance decision-making processes). This artwork is one of four ‘Scenario Artworks’ used at the *Vision 2040: Innovation in Mining and Minerals Forum*, which forms part of the research being conducted by the CSIRO Minerals Down Under National Flagship¹.



Figure 1: Artist's (Author's) Interpretation of ‘The Great Transition’ Scenario

Introduction

Scenario Art is a visual representation of a future scenario, used to enhance decision-making processes. Whilst visual representations of future scenarios are not a new practice (see for example Davis' *Stanford Torus* Figure 2), offering art as a tool to use during decision-making processes, for the purpose of facilitating a transition to sustainable futures, is a novel concept. It is proposed that Scenario Art, when coupled with decision-making processes that have foreseeable long-term implications on the sustainability of social, political, natural and economic environments, will facilitate a transition to sustainable futures.

The use of the term ‘sustainable futures’, as opposed to a ‘sustainable future’ is deliberate—many different futures can be sustained, from the perspective of sustaining human existence. Though, just as there are many ‘sustainable futures’, there are many unsustainable futures (futures that cannot sustain human existence). The notion of sustainable futures is a temporal one—raising questions such as, how far into the future are we aiming to sustain the human

¹ <http://www.csiro.au/org/MineralsDownUnderFlagship.html>

species for? Whilst this question is an important one and inextricably linked to the issues discussed in this paper, it is hugely complex and falls outside the scope of this paper.



Figure 2: Don Davis, *Stanford Torus*, 1975, NASA Ames/Stanford University

Questions for you

What Sort of Future do you Think we are Currently Heading Toward?

Do you Think that Today's World, with its Growing Population and Growing Consumption Patterns, can be sustained?

There is a very strong case, with a growing amount of evidence, to support that we are heading toward unsustainable futures. Futurist and sustainability researcher Riedy (2009, p. 40) argues that:

It is abundantly clear in this first decade of the twenty-first century that we face a series of unprecedented environmental and social challenges that, in combination, threaten the sustainability of human civilization.

Riedy's argument is greatly supported by international research from credible institutions including scenario modelling by the Inter-governmental Panel on Climate Change² and research into peak oil and peak minerals³; commodities that our current global economies are largely dependent on.

A significant contributing factor to the current threat to the sustainability of human civilisation is public governance. Camilleri and Falk (2009, p. 3) define 'public governance' as "the legal and political arrangements that underpin human responses to physical and social challenges". They propose that, "the principles around which public governance has been structured during the Modern epoch have reached their limits" (2009, p. 3). The political instability and policies of the twenty-first century that reflect short-term thinking support the proposition being made by Camilleri and Falk. In light of this, an urgent reawakening is needed; current public governance systems must be questioned and redesigned.

Causing a significant shift in public governance will require bringing to light, challenging and re-thinking the worldviews on which current public governance systems and related challenges are based, alongside the myths underlying these. A large task indeed, though arguably one that we are equipped for. A field of research, referred to as Futures work, provides a rich palette of theories, methods and techniques to effectively respond to this challenge. So why are we not heading in the direction of sustainable futures?

Futures Studies and Sustainable Futures

The Futures field is an area of work that sees value in, and provides tools for, foresight. It offers methods and techniques for developing scenarios (plausible, alternative and undesirable futures), visions (preferable futures), and tools for achieving visions-including various strategy development techniques such as back-casting (imagining that a vision has come to fruition and working backwards-filling in the steps that lead to the realisation of the vision) (Inayatullah, 2008; Inayatullah, 1996; Slaughter, 1991). It also provides tools for gaining insight into the root causes of existing challenges, and in doing so, increases ones capacity to strategically respond.

Whilst there are many success stories in applying futures methods and techniques there remains great opportunity to increase its influence for achieving sustainable futures. Riedy (2009, p. 41) analysed and evaluated the impact of futures work on public policy in the context of responding to climate change and concluded that, "futures work is currently falling well short of its potential to achieve influence over public policy and practice, and thereby contribute to a transition to a sustainable society". A few reasons for this short fall, proposed by Riedy (2009, p. 48) include:

- Much futures work remains shallow, focused on linear trends and lacking depth; and
- Most futures work runs up against a dominant western worldview in which short-term thinking is entrenched

² See for example, Intergovernmental Panel on Climate Change, *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, UK and New York, USA: Cambridge University Press, 2007.

³ For research on 'peak minerals' see: CSIRO, (2010), Mineral Futures Collaboration Cluster (2009-2012). Retrieved March 2, 2011, from: www.csiro.au/partnerships/mineral-futures-collaboration-cluster.html

In response, Riedy (2009, p. 53) calls for “methodological renewal to improve the depth and criticality of futures work”. Whilst acknowledging that existing advanced futures methods, such as layered and integral futures approaches are the core of this methodological renewal, Riedy calls for complementary methods and techniques that will increase the accessibility and impact of existing advanced methods. Scenario Art is offered in response to this call.

The offering of Scenario Art, as an additional technique to the already large methodological palette of futures work, is sensitive to what Bradfield (2005, p. 795) describes as “methodological chaos”. The decision to offer this technique has been evaluated on its ability to make long-term thinking easier and to bring greater depth to participant responses. It is proposed that Scenario Art increases the accessibility of existing advanced futures methods and enables greater insights to be drawn by providing an efficient and effective way of challenging worldviews and facilitating long-term thinking, creativity and empathy.

These propositions are supported by the results of the *Vision 2040* workshop, which ran over two days in Brisbane, Australia 14-15 November 2010. The application and results of using Scenario Art at *Vision 2040* are discussed and evaluated below. Insights into the results are drawn through an analysis of supporting art and neurological theory.

Case Study of Applying Scenario Art: *Vision 2040*

Background

Vision 2040 forms part of the Commodity Futures stream in a broader program of research supported by the CSIRO Mineral Futures Collaboration Cluster (2009–2012) within the Minerals Down Under Flagship⁴, which is addressing the future of sustainability challenges of the Australian minerals industry. The specific aim of *Vision 2040* was to develop a shared vision, and strategy to achieve this vision, for Australia’s minerals industry to deliver long-term national benefit.

Scenario Art was used on the second day of the two-day workshop. It was used to introduce four different scenarios to the thirty participants. The participants represented a variety of mining stakeholder groups including industry, government, academia and one high school student. Three of the four scenarios reflected plausible futures and were based on research conducted by the World Economic Forum during 2009 (World Economic Forum, 2010). The fourth was based on ‘The Great Transition’ (Raskin et al, 2002), which reflects a socially and environmentally sustainable future; one that emphasises human agency and reflexive capacity (the capacity to perceive a desirable future and respond to environmental forces so to achieve that vision).

The use of Scenario Art aimed to bring the scenarios alive, so that the participants could get a real feel for them and imagine themselves in these different worlds. It was used to engage the creativity and imagination of the group, and provoke innovative responses to the scenarios, which were used in the development of a vision and strategy that demonstrate foresight, innovation and sustainable thinking.

⁴ The CSIRO is Australia’s Commonwealth Scientific and Industrial Research Organisation. Information on the CSIRO Mineral Futures Collaboration Cluster (2009–2012) can be found at: www.csiro.au/partnerships/mineral-futures-collaboration-cluster.html.

Method for applying Scenario Art (in General)

1. Artworks of the subject scenario/s are created.
The scenario(s) may describe the social, political, economic and natural environments of the scenario(s).
2. Facilitator/Artist explains the purpose and value of analysing the artworks to the participants.
This could involve introducing and discussing the notion of the 'death of the author'. The notion of the 'death of the author' is a philosophical concept that relates experience to perception. In the context of art, the concept communicates the notion that they who experience an artwork creates meaning in the work and this meaning is just as relevant than the meaning intended, if any, by the artist. The purpose of introducing this concept is to encourage participants to appreciate that their interpretations of the artworks are valid and valuable. How appropriate it is to introduce and discuss this concept will depend on the nature of the participants and the time available.
3. Facilitator/Artist presents the Scenario Art and describes, but does not analyse, the Scenario Art.
The facilitator or artist should detail the key characteristics of the scenario(s) to a sufficient extent but should not draw out the implications of these characteristics or make a judgment of the scenario.
4. Facilitator/Artist encourages the participants to individually reflect on and draw meaning into the Scenario Art.
In the case of a group it is important to encourage participants to do this step on their own and preferably in silence. This step enables insights to be drawn into the participant's worldviews. It is desirable to capture these insights; this could be done by an observer taking notes during later discussions or through worksheets that participants fill out during this interpretation step.
5. Facilitator/Artist opens the interpretation activity up for group discussion.
Facilitator/Artist should work to ensure that each participant has an opportunity to contribute.

Sharing multiple interpretations of the Scenario Art with all participants will help the group identify common values, ideas and interests of the participants, which will help to identify common and complementary goals and opportunities. This will assist the development of strategies that offer maximum value to maximum stakeholders in the challenge at hand.

Creating Scenario Art for *Vision 2040*

Much research went into developing the content of the scenarios. The artist then pulled out what they considered to be the key defining elements of the scenarios and represented these through images. The works are largely and deliberately metaphoric and symbolic. The artworks were drawn on recycled cupboard doors to encourage ideas for creative use of resources. Figure 3 presents one of the scenarios, 'Rebased Globalism', created for *Vision 2040*. The artist's interpretation of the images in the artwork is provided below Figure 3. The artist's interpretation is included for the purpose of provoking thought in people who are not familiar with sustainability challenges of the mining and minerals industry in Australia.

However, alternative interpretations are encouraged, in the appreciation that art should allow the brain of the viewer to interpret the work in a number of ways, all of which are equally valid (Zeki, 2001).



Figure 3: Artist's, (Author's) Interpretation of the 'Rebased Globalism' Scenario

Artist's Interpretation of 'Rebased Globalism'

The top of the artwork is covered in reaching arms between nation states, representing the fully globalised world and complex networks.

The large hands reaching toward Australia, illustrate the important role that Australia is playing in the global arena. Australia is realizing huge wealth from its mineral endowment.

Just right from the centre, the Australian government has its mind fixated on the economic, political and resource issues outside Australia and has its back to the social and environmental issues arising within Australia. The detrimental social and environmental changes that are occurring and becoming more intense are illustrated through the desperate and bleak figures in the bottom right hand corner and the dying landscape to the right.

At the top of the artwork is a miner on a tipping ladder, representing mining companies who are aware of the economic, social and environmental risks of continuing traditional mining practices and yet continue to take great risks to meet increasing global demand.

The robotic figures in the middle, the yellow machinery self-powered by solar concentrators and the leaching technologies in the far right, represent technological advancement and improved production efficiencies that have been developed in response to the realization of falling ore grades and qualities.

The few happy faces spread only across the faces of the mining industry that is receiving the bulk of Australia's mineral wealth, as the government has made no attempt to facilitate equitable distribution of Australia's mineral wealth.

At the bottom centre, a child, representing youth, is terrified of its future but is holding on to hope represented by the child's distressed face and the action of clinging on to the life left in the withering tree.

Applying Scenario Art at *Vision 2040*

The method detailed at 3.2 was followed.

The works were presented to the thirty participants at *Vision 2040* and the artist described the key elements, as detailed in 3.3 above. The artist emphasized the value of having different eyes observe the works—eyes that bring different experiences with them and as a result draw different meaning into the works.

Participants were divided into four groups; each group was provided with one of the four artworks. The participants were asked to contemplate the artworks on their own, in silence, and answer a worksheet that asked them to identify what aspects of the scenarios resonated with them, and what opportunities and challenges they could see in the scenario allocated to their group. Participants were then asked to share and discuss their responses in the small groups. This was then opened up for larger group discussion.

Results of using Scenario Art at *Vision 2040*

Not only did the thirty different mining stakeholders share their personal perspectives and creative ideas but they expressed a great willingness and interest to learn of alternative perspectives.

The artworks provided an opportunity for participants to readily access and engage with the future scenarios in their own way. This contrasted the experience of the earlier World Economic Forum workshop, held in September 2010, where the same scenarios were presented in a plenary session using a corporate video format. On this occasion, there was much more discussion on whether each scenario was in fact plausible or not, rather than on exploring the implications of the scenarios and the opportunities that each presents.

The results of the *Vision 2040* highlight the ability of art to evoke great emotion, creativity and innovative ideas—all of which are highly valuable in transitioning to sustainable futures. Existing literature on art therapy theory and neurological processes involved when the brain is experiencing art, provide insight into the results of the workshop, and provoke thought on the potential for Scenario Art to assist the futures field in achieving sustainable futures.

The Case for Scenario Art

The potential of Scenario Art to bring about sustainable futures is grounded on several levels, some supported by existing art and neurological theory and others through the experience

of the author in observing the application of Scenario Art at *Vision 2040*, on which several hypotheses have been drawn.

Existing art and neurological theory support the value of Scenario Art in a pursuit for sustainable futures. Such theory provides insights into the ability of art to:

- Generate empathetic feelings;
- Increase responsiveness to risk; and
- Activate the imagination and increase creative responses

An overview and discussion of these abilities is now provided.

Arts Ability to Generate Empathetic Feelings

The Painting will move the soul of the beholder when the people painted there each clearly shows the movement of his own soul...we weep with the weeping, laugh with the laughing, and grieve with the grieving. These movements of the soul are known from the movements of the body (Alberti, 1972, p. 80).

The quote above provokes thought on the embodied phenomena that are experienced when contemplating art. Such phenomena have gained the interest of neuroscientists who attempt to gain insight into the neurological processes that are stimulated when art is being contemplated (e.g. Freedberg and Vittorio, 2007; Livingstone, 2002; Ramachandran, 1999; Solso, 1996; Zeki, 1999 and Zeki, 2002). The work of Freedberg and Vittorio (2007) provides insight into the empathetic feelings generated by neural mirroring mechanisms.

As put by Freedberg and Vittorio (2007, p. 197),

Most spectators of works of art are familiar with feelings of empathetic engagement with what they see in the work itself. These feelings might consist of the empathetic understanding of the emotions of represented others, or most strikingly, of a sense of inward imitation of the observed actions of others in pictures...

Freedberg and Vittorio (2007) support the above argument through discussing the ways in which viewers of art report bodily empathy. Detailed descriptions of responses to works such as Michelangelo's *Slave called Atlas*, and Goya's *Los Desastres de la Guerra*, demonstrate the ability of art to evoke incredibly intense emotional feelings and cause the body to physically feel the experience of the subjects in the art works. On assessment of the reported responses to Michelangelo's *Slave called Atlas*, Freedberg and Vittorio (2007, p. 197) recognise that "responses often take the form of felt activation of the muscles that appear to be activated within the sculpture itself, as if in perfect consonance with Michelangelo's intention of showing his figures struggle to free themselves from their material matrix".

In the case of Goya's *Los Desastres de la Guerra*, empathy is stimulated by physical responses that mirror those parts of the body of the characters in the painting that are threatened and constrained. This physical empathy then causes emotional empathy, whereby the viewer feels the emotional consequences of the body experiencing the damage being threatened.

The insights drawn by Freedberg and Vittorio (2007) provoke thought on the implications of the mirroring mechanisms and embodied simulation for empathetic responses to art. These insights support the proposition that coupling art experiences with decision-making processes,

whose outcomes have foreseeable long-term consequences, will increase the occurrence of decision outcomes that advance sustainable futures, on the basis that the physical and emotional implications of the people who are affected by the decision outcomes are felt by the decision-makers and thus influence the decisions.

In a positive light, experiencing the well-being of characters and an environment that exists in a preferred future may motivate thought, decisions and actions toward achieving such future. With arts ability to evoke empathy with those who experience the repercussions of short-term thinking, coupled with an appreciation of the need for new governance structures and worldviews, Scenario Art offers significant value in a transition to sustainable futures. Whilst the results of *Vision 2040* support this proposition, it is a hypothesis that was generated on evaluating the results, i.e. after implementing the first application of Scenario Art, and thus further research is needed to specifically test this hypothesis.

Responsiveness to Risk

Neurological studies demonstrate that contemplating art activates a specific part of the brain, commonly referred to as the 'visual brain' (e.g. Zeki, 2001), which is located in the brain's right hemisphere (Lusebrink, 2004). Monti et al (2006) provides an overview and assessment of the results of a study that gathered data on the efficacy of mindfulness-based art therapy. This study involved a psychosocial group intervention for cancer patients using art to decrease symptoms of distress and improve key aspects of health-related quality of life. In evaluating the results of the study Monti et al (2006, p. 364) propose that,

The stimulation of art media in art tasks may activate the right hemisphere via kinaesthetic and sensory activity, which leads to greater awareness of different aspects of threatening events, including emotional responses.

Whilst further research is needed to support the above proposition, it provokes thought on the value of Scenario Art in the context of decision-making processes that are responding to challenges that involve significant elements of risk—such as political responses to anthropogenic greenhouse gases, peak oil, water scarcity, food shortages, energy demands etc.

In the context of *Vision 2040*, risk included environmental and social risks of continuing traditional mining techniques. Communicating these risks through art had the effect of generating greater thought and discussion around issues of sustainability, including intergenerational equity, equitable distribution of wealth, and the destructive impact that traditional mining processes are having on the natural environment and non-mining industries. Having such an impact on thought processes during decision-making processes may increase the likelihood of experiencing decisions that are guided by long-term sustainability goals and that demonstrate greater empathy toward all life that is impacted by the subject decisions.

The ability of art to increase our emotive states, as demonstrated at 4.1, and responsiveness to risks and threats, as demonstrated at 4.2, increases the capacity of futures work to expose root causes of challenges and provoke thought on alternative, strategic and sustainable responses to sustainability challenges and opportunities.

Activate the Imagination and Increase Creative Responses

The value of Scenario Art largely rests in the ability of art to engage the imagination and stimulate creative abilities of the brain.

Through these abilities, art has great potential to influence cognitive thought processes toward innovative thinking, which is invaluable in responding to challenges that require a significant shift in public governance systems and world-views. Engaging the imagination and our creative abilities increases our capacity to generate innovative and creative responses (thoughts, discussions and decisions). The results of *Vision 2040* support this proposition.

Visual art, and one's response to it, has been described as a product of the visual brain (Zeki, S. 2001). There is great variability in how humans perceive their surroundings. Providing an explanation for this is that the brain, the organ that is responsible for our perceptual capabilities, is the most variable and fastest evolving organ (Zeki, 2001). Also on the palette affecting our perceptions, both in creating and contemplating art, are of course life experiences. Sharing responses to visual art, from a variety of people, increases the depth of the pool of thoughts and ideas for responding to the challenge/s that are subject to the decision-making processes.

With different perspectives being shared, and with other conditions such as having adequate time and an effective facilitator, new innovative ideas can be generated and pursued together, realising synergetic value.

Hypotheses

The value of Scenario Art, as a technique to facilitate a transition to sustainable futures, is further based on the hypotheses set out below. Further research to test these hypotheses would provide a valuable contribution to the exploration of the value that Scenario Art offers to decision-making processes, so that the decision outcomes of such processes are more likely to be consistent with inter- and intra-generational equity pursuits.

- **Hypotheses 1: Scenario Art acts as an equaliser**

When the activity of art analysis is a foreign or uncommon exercise to the decision-makers participating in the decision-making process it removes the element of expertise, thereby placing all participants on a level playing field.

- **Hypothesis 2: Scenario Art increases the willingness of participants to share and actively listen to alternative perspectives**

Analysing Scenario Art creates an environment where participants have an increased willingness to share and actively listen (listening which influences ones thoughts and potentially actions) to alternative perspectives. Appreciating different perspectives encourages different ways of knowing (Foucault, 2002), which increases ones capacity to draw different meanings into an object or issue, to evaluate root causes of problems and challenges, and to subsequently develop effective strategies for achieving sustainable futures.

- **Hypothesis 3: Scenario Art offers a tool to effectively and efficiently respond to systems that are unsustainable by increasing the viewer's awareness and appreciation of the unsustainable nature of current public governance systems**

This hypothesis relates to art's ability to generate empathetic feelings as discussed at 4.1, which supports the proposition that in contemplating artworks that expose unjust outcomes of existing public governance systems, through figurative and environmental images experiencing harm and distress, the viewer's mirroring mechanisms of the brain will come into play causing the viewer to empathise with the people and environment that feel the effects of the decisions in question through embodied simulation.

- **Hypothesis 4: Scenario Art provides opportunities for self-development through reflecting on how one perceives an artwork and the worldviews that these may expose**

This hypothesis sees value in providing decision-makers with an opportunity to take time to stop and think of the long-term implications of their decisions, which today is arguably largely taken out of the hands of politicians and business men as a result of their busy schedules and the institutional frameworks which hold them accountable to short-term policy objectives and short-term stakeholder profits respectively.

Conclusions and Guidance for Further Research

*In art we embody the others state; whilst our 'self' experiences dissection;
In art we gain new eyes, new thoughts, affecting our direction.*

The short poem above describes the value of contemplating art in affecting the decisions and actions that we subsequently make. It acknowledges the neurological processes that occur in experiencing art, supports the hypotheses made in this paper, and highlights the ability of art to challenge current worldviews and cause a reawakening from current ways of thinking that reflect unsustainable and short-term pursuits.

Existing art and neurological theory support the proposition that Scenario Art offers great potential to enhance decision-making processes so that the decision outcomes of these processes facilitate a transition to sustainable futures. The value of Scenario Art can be found in its ability to evoke empathetic feelings for the characters and the natural environment in the artworks, and its ability to stimulate innovative and creative thought. In addition, Scenario Art has value in its ability to cause participants to become aware of different perspectives and appreciate these, as with an increasingly open mind one becomes more willing and able to challenge existing world-views and consider new ones. Scenario Art offers significant value in the context of decision-making processes, particularly those that involve decisions with potentially significant long-term implications on the sustainability of human civilisation. The potential value that Scenario Art offers for sustainable long-term decision making provides a strong case to continue research into the practicalities and effectiveness of this new tool for transitioning to sustainable futures.

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About the Author

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My work ranges across several research areas but all with the common thread of contributing to sustainable futures. Various areas that I conduct research in include the minerals and mining industry, the remediation of contaminated lands, participatory democracy and the use of art to engage stakeholders in various issues. I am currently developing a method and organising a project that will involve a travelling exhibition around Australia that invites the observers to become the artists of the show, literally, we are hanging blank canvases and inviting observers to draw, paint and write about their visions on particular issues. My background includes legal research for environmental NGO's, voluntary climate law work and being a practicing artist in life drawing.